

Initial Mixing for Open Water Placement

Tab J

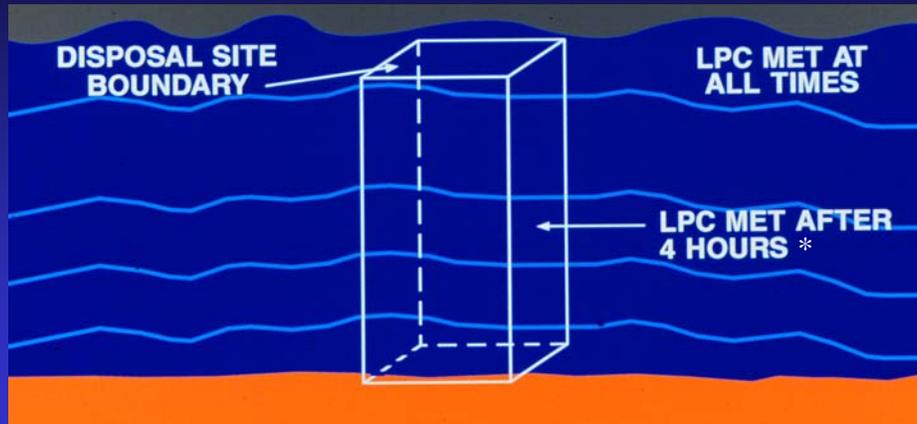
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KEY WORDS: Section 404 Regulation,
Section 103 Regulation, Open Water Disposal,
Aquatic Placement

Initial Mixing

- MPRSA 40 CFR 227.29
 - Limiting permissible concentration
 - Defined both within and outside designated site
- CWA 40 CFR 230.3(m)
 - Defined by 401 Water Quality Certification

Evaluation of Initial Mixing



* For Ocean Disposal

Applicable Models

Type of Discharge	Characteristics of Discharge	Nearfield Effects	Hydro-dynamics	Model
Barge	Discrete	Strong	Steady Non-Uniform	STFATE
Hopper	Semi-Discrete	Moderate	Steady Non-Uniform	STFATE
Pipeline	Continuous	Moderate	Steady Uniform	CDFATE CORMIX DIFCD
			Non-Steady Non-Uniform	TABS ICM-TOXI

Models for Barge/ Hopper Discharge

- Processes are complex; must rely on models
- Short-term covers release, descent, spread, and dispersion
- Original model developed by EPA (DUMP)
- Modified and refined by WES (STFATE)
- Verified by data at several sites
- Additional refinements and verification underway

STFATE Model for Discrete Discharge

DIFID - Disposal From an Instantaneous Discharge

DIFHD - Disposal From a Hopper Dredge

are now combined into

STFATE - Short-Term FATE

Hardware/ Software



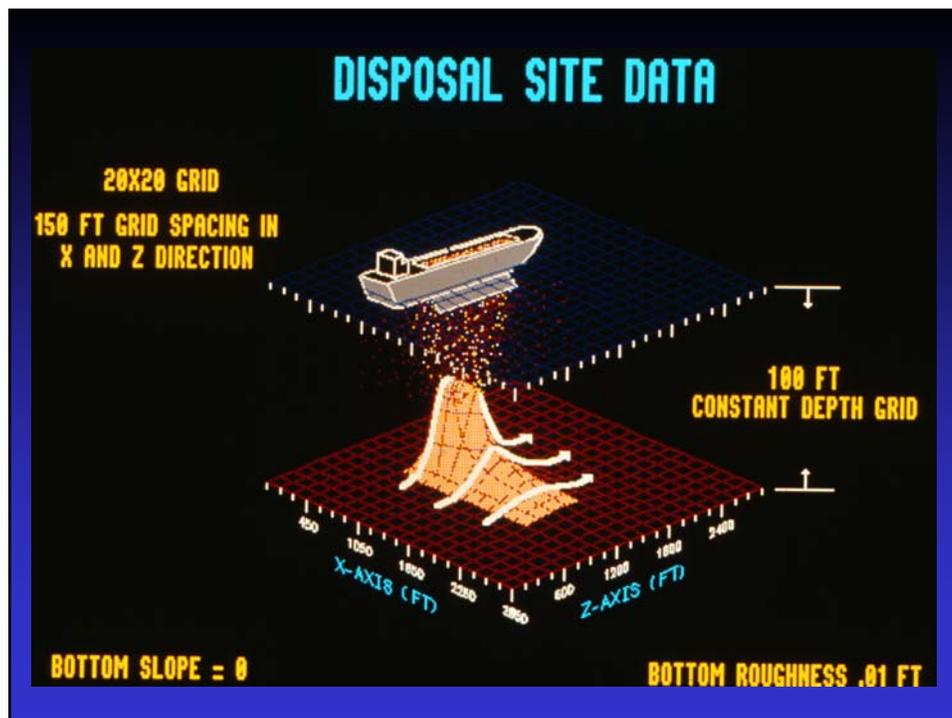
- PC Based
- DOS Version
- Windows Version
- SMS Version

STFATE Disposal Phases Modeled

- **CONVECTIVE DESCENT** - controlled by gravity and momentum
- **DYNAMIC COLLAPSE** - bottom encounter, spreading dominates
- **PASSIVE TRANSPORT DISPERSION** - currents and turbulence dominate

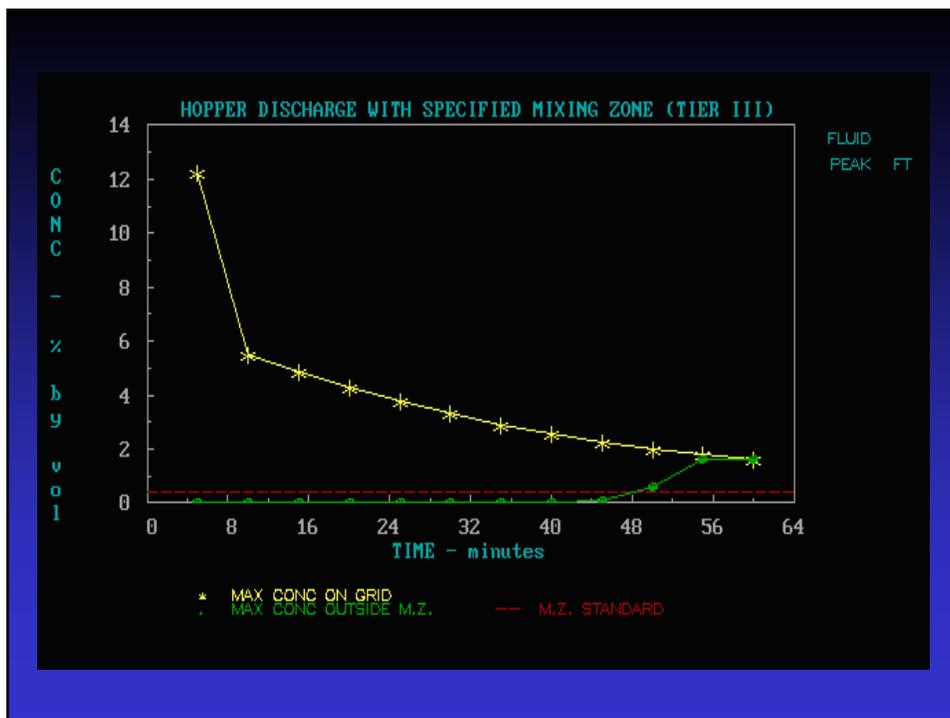
Input Requirements

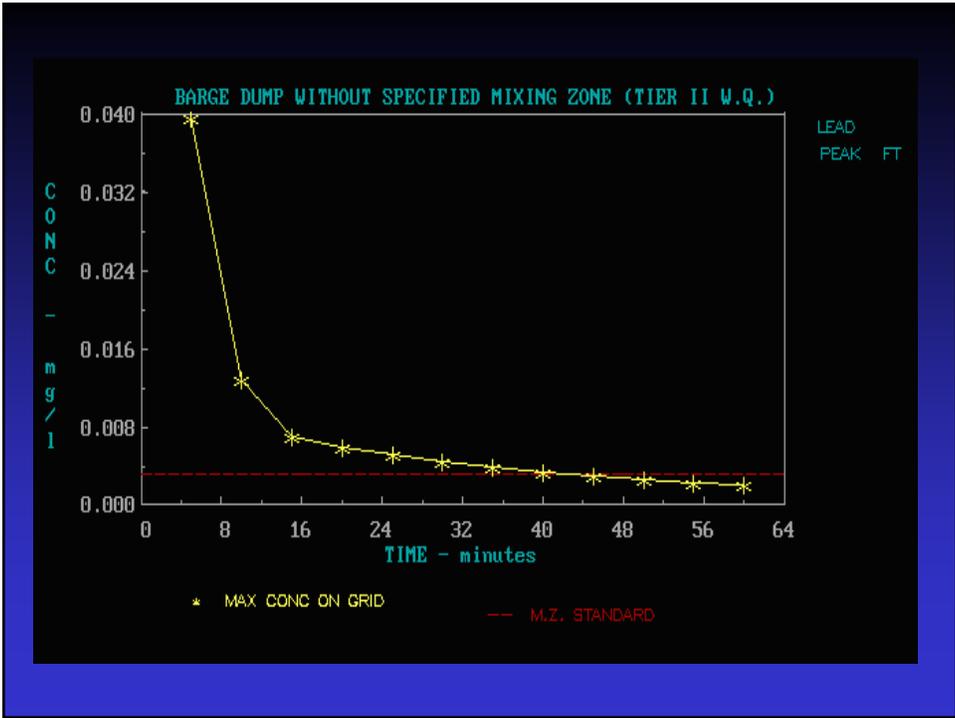
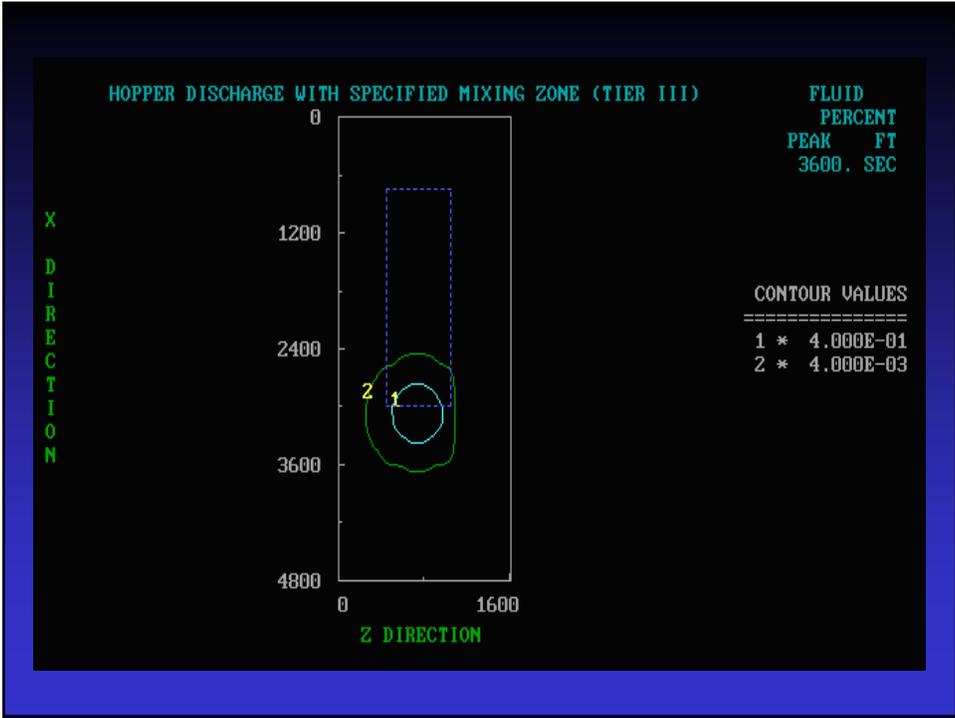
- Disposal operation
- Disposal site
- Dredged material
- Model coefficients
- Input / output / execution controls



Output Data

- Time history of descent and collapse phase
- Plume concentrations by time / depth
- Accumulation of material on bottom
- Max concentrations







STFATE Model Limitations

- Shallow water limitations
- Material assumed to behave as dense fluid
- Advection assumed to occur by velocity at centroid of contaminant plume